

Pliant Ranking

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Multi-criteria decision management applications are important tools for decision makers. One of the difficulties in decision management is the comparison of the alternative choices. The alternatives are often described with human words or given with fuzzy boundaries and as such cannot be ranked easily. Fuzzy theory [10] provides a mathematical foundation for modelling imprecise values and elusive human words [11]. There has already been a lot of effort to aid the decision process with fuzzy ranking algorithms.

One of the earliest fuzzy ranking function comes from Shimura and is based on a comparison method which is adopted for psychological test [9]. Buckley and Chanas [1, 2, 3] provided a fast ranking method using interval analysis. The ranking algorithm introduced by Cheng [4] is based on calculating distances. Delgado et al. [5] gave an ordering procedure using fuzzy relations and fuzzy measures. The preference relation described by Kundu [8] utilizes a fuzzy leftness relation on intervals.

Despite the many different approaches, there is still no consensus which ranking method is the best suitable for applications. The problem arises from the requirements that the ranking algorithm should run fast and have all the properties that a ranking procedure over crisply defined objects has.

In this paper we propose a novel preference ranking method based on the pliant concept [7]. Pliant ranking provides a pairwise choice between two alternatives and can be calculated easily. Our algorithm models the various alternatives with fuzzy numbers and defines a preference relation over them. We prove that pliant ranking fulfills all the necessary properties associated with preference methods, i.e. shift invariance, transitivity and shift monotonicity.

References

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